

RAUG Discussion

Delphi Methods for Risk Evaluation:
Constraints

The Answer is
Experts' Evaluation

Variable A

Picking from a scale of
answers
e.g. 1 – 10, low – high.



**Consult the
Oracle at Delphi**

Delphi Method

Variable X

Variable Y

	very low	low	low med	high med	high	very high
very low						
low						
low med						
high med						
high						
very high						

In a situation where a two variable equation has variables difficult to calculate, experts express their opinion what each value may be for a certain situation.

The result of the process is an answer for the variable Z.

Z = function of X and Y

Exposure

Vulnerability

	very low	low	low med	high med	high	very high
very low						
low						
low med						
high med						
high						
very high						

Example:
Consequence of a Hazard event on an asset

Delphi Method

Probability

Consequence

	very low	low	low med	high med	high	very high
very low						
low						
low med						
high med						
high						
very high						

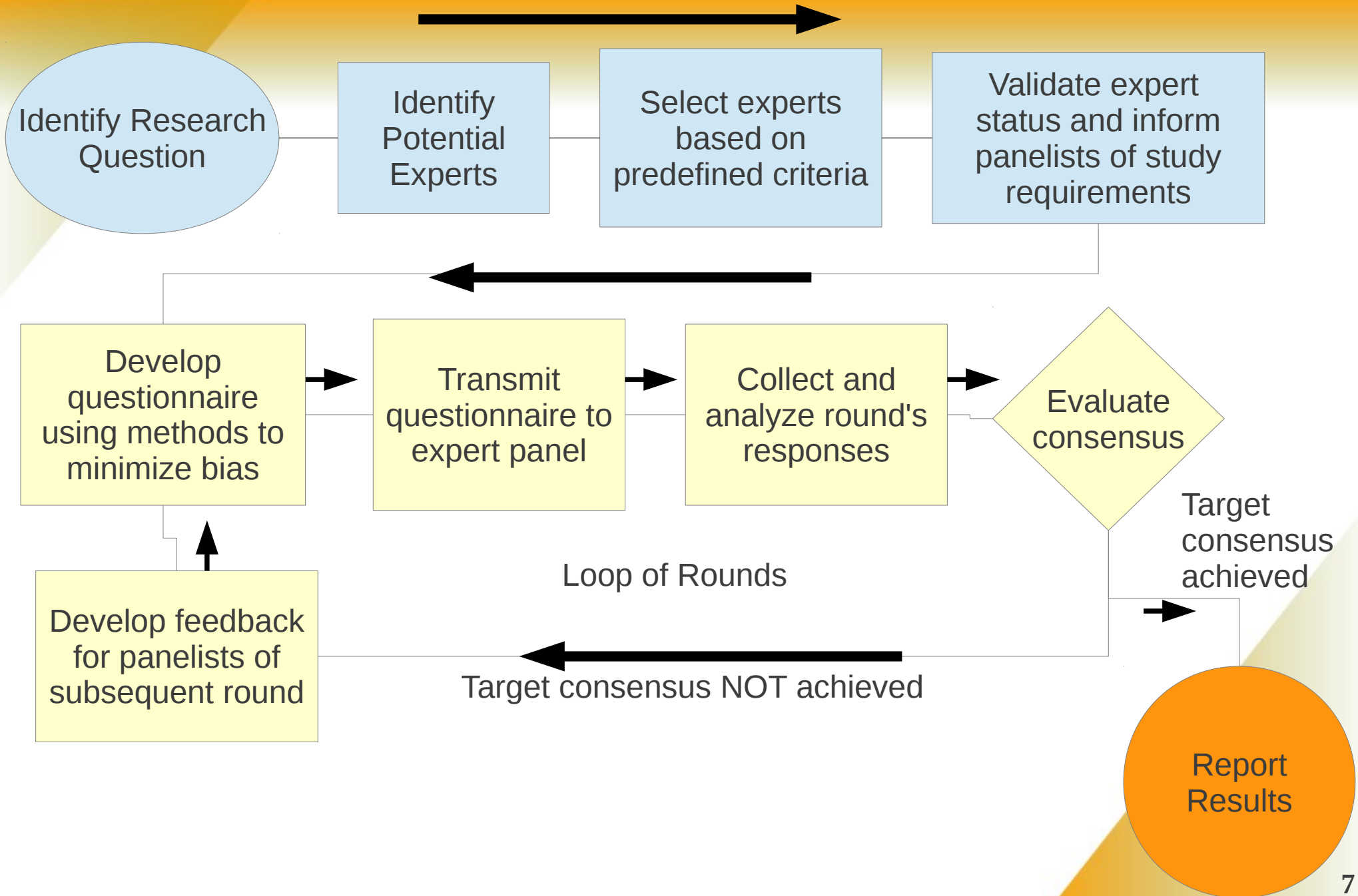
Consequence from the last determination can then be used in a new equation: in this case to determine Risk of Hazard event harming the asset

Engineering example

Hallowell, M. and Gambatese, J. (2010).
"Qualitative Research: Application of the Delphi
Method to CEM Research."

J. Constr. Eng. Manage. 136, SPECIAL ISSUE:
Research Methodologies in Construction
Engineering and Management, 99–107.

Delphi Method Process



Method Characteristics

1. Identifying potential experts
2. Qualifying panelists as experts
3. Number of panelists
4. Number of rounds
5. Feedback for each round
6. Round 1
7. Round 2
8. Round 3
9. Measuring consensus

1. Identifying Potential Experts **RAUG**

- Membership in a nationally recognized committee in the focus area of the research (e.g., ASCE Site Safety Committee)
- Primary writer of publications in ASCE journals
- Known participation in similar expert-based studies

2. Qualifying panelists as experts RAUG

Experts must satisfy at least **four** of the following criteria in the topics related to the research:

- Primary or secondary writer of at least three peer-reviewed journal articles
- Invited to present at a conference
- Member or chair of a nationally recognized committee
- At least 5 years of professional experience in the construction industry
- Faculty member at an accredited institution of higher learning
- Writer or editor of a book or book chapter on the topic of construction safety and health, or risk management
- Advanced degree in the field of civil engineering, CEM, or other related fields (minimum of a BSc)
- Professional registration

3. Number of panelists

8-12

4. Number of rounds = 3

5. Feedback for each round:

6.Round 1: Data from preliminary research or archived data (if available)

7.Round 2: Median response from Round 1

8.Round 3: Median response from Round 2 and reasons for outlying responses

9.Measure of Consensus: Absolute deviation (with consensus indicated by a value $< 1 / 10$ of the range of possible values for quantitative studies)



- Judgment-Based Bias in Risk Studies
- Collective Unconscious (bandwagon)
- Contrast Effect (influence of previous value)
- Neglect of Probability
- Van Restorff Effect (preferential memory of extreme events)
- Myside (one-side, opinion based irrationality)
- Recency (increased rate for recent incidents)
- Primacy (higher rating for items first evaluated)
- Dominance (overbearing person influences others)